Problem-18

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By what factor must the mass number change for the nuclear radius to become twice?

Solution:-

Nuclear radius $R = R_0 A^{1/3}$

Let the new mass no be A_1 & new radius is R_1. We want $R_1 = 2R$

$$\therefore \frac{R_1}{R} = \frac{R_0 A_1^{1/3}}{R_0 A^{1/3}}$$

$$\therefore \frac{2R}{R} = \left(\frac{A_1}{A}\right)^{1/3}$$

$$\therefore \left(\frac{A_1}{A}\right)^{1/3} = 2$$

$$\therefore \left[\left(\frac{A_1}{A}\right)^{\frac{1}{3}}\right]^3 = 2^3$$

$$\therefore \frac{A_1}{A} = 8$$

$$\therefore A_1 = 8A$$

∴ If mass is 8 times, nuclear radius doubles.

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